

**EXHIBIT 224**  
**REDACTED**

## Self Competing Candidates in the AdX Auction

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### Summary:

In the Ad Exchange auctions, the candidates may come from identical advertisers. The self competition has no effect on the winner of the auction, but it has an impact on the final price in a second-price auction. This discourages the advertisers from buying on Ad Exchange as they have concerns on paying higher prices set by themselves. We conducted a set of experiments to investigate this problem and we will make decisions based on the collected data.

### Experiment Settings:

There are three ways to determine if two auction candidates are self competing with each other:

1. They have the same advertiser id.
2. They have the same url.
3. They have urls with the same domain.

Correspondingly, the duplicated candidates can be removed at these three granularity levels. It's clear that level 3 is "coarser" than level 2. Level 1 is coarser than level 3 in theory, but we don't have 100% coverage for advertiser classifications. Therefore we will miss some advertisers if we use level 1.

### Experiment Results:

We conducted the experiments for 4 consecutive days (01/26/2013-01/29/2013). The aggregated data are shown below. The first column shows the occurrence of the self competition. The ratio in the 2nd column represents how frequently an auction would contain at least one self competing candidates. The last two columns show the revenue impact of the

duplicates removal, the numbers represent the decrease of the RPM. The third column shows the impact for transactions with AdX buyers and the last column shows the impact for transactions with all (adwords + AdX) buyers. (Please note that the impact for transactions with adwords buyers only is not significant). The first number in each cell is the impact for all sellers. The two numbers in the parentheses are the impact on different seller networks (AdSense vs. AdX). See the [rasta page](#) for details.

	# of cases with duplicate candidates / # of cases	Ratio	Drop of RPM for AdX buyers after duplicates removal: All sellers (AdSense seller, AdX seller)	Drop of RPM for all (adwords + AdX) buyers after duplicates removal: All sellers (AdSense seller, AdX seller)
Level 1				
Level 2				
Level 3				

**Conclusion:**

TBA.